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ABSTRACT

This study of motivational differences in the school situation and the development of a sensation-seeking scale of preadolescent children rests upon an interactive psycho-biological theory formulated by Farley (1981). Stimulation-seeking and arousal in relation to instructional features are central concepts. As a point of departure for the development of the scale, a sensation-seeking scale developed by Zuckerman et al. (1964) was analyzed in regard to its applicability with 12-13 year-old children, and adapted to Swedish children of this age. Special attention was paid to the dimensionality of sensation-seeking by using different factor-analytical procedures, and then contrasting the resulting factor patterns. The main criterion for a special solution to be chosen was that of factorial invariance in spite of the procedures used in the analysis and across the sexes. An emphasis was also laid on sex differences that emerged in the factor patterns for females and males. After the examination of the different factor structures, a solution with one general factor of sensation-seeking was selected as most valid. This implies that sensation-seeking is regarded as an unidimensional concept. (Author/CM)

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Development of a sensation-seeking scale for preadolescent children

Eva Björck-Åkesson

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"Every man is in certain respects like all other men,
like some other men,
like no other men".

(Kluckhohn & Murray, 1948)

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Summary

This report has grown out from an interest in motivational differences in the school-situation, and deals with the development of a sensation-seeking scale for preadolescent children.

Sensation-seeking tendency has come to be regarded as a fundamental part of motivation in the last twenty years, and researchers have approached the question of measuring it in different ways, psychologically as well as physiologically. In this study the definition of motivation and sensation-seeking rests upon a psycho-biological theory formulated by Farley (1981), which is presented in detail before introducing the study.

As a point of departure for the development of the scale a sensation-seeking scale developed by Zuckerman et al. (1964) has been used. This scale has been analyzed in regard to its applicability with 12-13 year old children, and thereafter adapted to Swedish children of this age.

Special attention is paid to the dimensionality of sensation-seeking by using different factor-analytical procedures, and then contrasting the resulting factor patterns. The main criterion for a special solution to be choosen has been that of factorial invariance in spite of procedure used in the analysis and across the sexes. An emphasis is also laid on sex differences that emerge in the analysis. The factor patterns for females and males are compared, and the differences between the sexes are discussed.

After the examination of the different factor structures a solution with one general factor of sensation-seeking was selected as most valid. This implies that sensation-seeking is regarded as an unidimensional concept.

1 Introduction

Motivation has been studied from different theoretical perspectives, from the drive-reduction theories based on pure physiological reasoning, to the theories based on "inner needs", like the ones pronounced by theorists of an analytic persuasion. The discrepancy between different perspectives, in regard to where the motives arise, has caused research in the area of motivation to be concentrated on the task to outline different motives and their origin. The origin of motivation per se has attracted less attention, and the underlying mechanisms have not been explored to a greater extent until recently. In the last twenty years, however, underlying mechanisms like level of arousal and stimulation-seeking has been more in focus, and sensation-seeking tendency has come to be considered as a fundamental part of motivation.

The background to this report is an interest in individual motivational differences in connection with learning, and as a starting-point a measure of the tendency to seek stimulation or sensation has been evaluated and adapted. The measure that has been used is the sensation-seeking scale developed by Zuckerman et al. (1964), and it has been adapted to research with children 12-13 years of age. Attention is in particular paid to the dimensionality of the concept sensation-seeking. In addition, differences between the sexes in the domain of sensation-seeking are studied.

The sensation-seeking scale developed by Zuckerman et al. rests upon the assumption that individuals differ in stimulation-seeking motivation, and was designed to assess individual differences in optimal level of stimulation. Zuckerman asserts that " the need for change, variety, and intensity of stimulation would manifest itself in many aspects of behavior, including sensory, social, and thrill-seeking types of behavior" (1971, p.45). Accordingly, the sensation-seeking scale is constructed to measure the individual´s sensation-seeking behavior in different situations. In this context level of arousal is essential, as it is presumed to be an underlying element that determines the individual´s tendency to seek variety and change.

The definition of motivation in this study is based on an interactive psychobiological theory proposed by Farley (1981). The central psychological concept in this theory of motivation is "stimulation-seeking", whereas the biological concept in focus is "arousal". The model outlined by Farley is relevant for educational research, since the goal is to study basic individual differences fruitful in relation to different instructional features. As the study presented in this paper builds on Farley´s theoretical framework his theory will be presented in more detail before introducing the study.

2 Farley´s general theory of the sensation-seeking motive

Farley (1981) presents a general theory of the stimulation-seeking motive in a paper on "Basic Process Individual Differences". In the paper he argues that in order to comprehensively study behavior one must have a holistic view of man, considering bodily as well as psychological factors. He therefore suggests that to understand and further develop constructs like cognition, personality, emotion and motivation a psycho-biological perspective is necessary. Farley says: "We must search for more complex, natural, ecologically valid learning paradigms, and we must include the simultaneous study of bodily events involved in behavior." (1981,p.3-4). Taking this perspective involves a further integration of the sciences, and thus regarding individual differences in a wider sense.

Central in Farley´s analysis of individual differences are the concepts "basic" and "process". Basic refers to the classical level of science model, where the more basic ideas also are the more biological ones. Process refers to the particular ways of performing, involving a number of operations, that underlie attention, memory and learning and which can be both psychological and physiological. In other words, Farley´s intentions are to describe human behavior as a product of basic processes, both bodily and psychological, and the environment. He wants to describe how these processes function within an individual and relate them to different aspects of the environment.

The physiological arousal-system has both dynamic and directive aspects. The dynamic aspects of arousal are believed to be mediated by the Ascending Reticular Activating System (ARAS) situated in the brainstem. This part of the brain consists of a highly interconnected network of neurons and is divided into two parts, the mesencephalic part and the thalamic part. Stimulation of the mesencephalic part of the system causes general increase in the cerebral activity while stimulation in the thalamic portion activates localized regions of the cerebral cortex. The limbic system, which is phylogenetically old, mediates the directive aspects of arousal. This part of the brain consists mainly of hypothalamus, hippocampus, amygdala and a part the thalamus. It is the association area for control of most of the behavioral functions of the body (Guyton, 1969).

Farley talks about Arousal Process I and II, refering respectively to the dynamic and directive aspects of arousal. In his paper on "Basic Process Individual Differences" he concentrates on Arousal Process I, the one mediated by the ARAS, which is responsible for generalized and dynamic arousal. According to Farley the construct of stimulation-seeking refers to " a pervasive, important but little understood characteristic of human motivation, the seeking, or avoiding, of stimulation, -sensation, -arousal" (1981,p.8). He asserts that we now are in "the age of arousal" where both intensity and variety of stimulation may be exceptional, and therefore it is important to assess what effect stimulation has on different individuals.

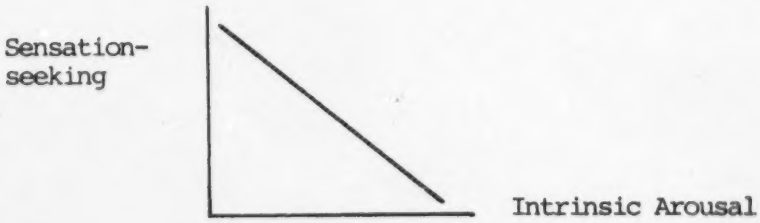
In the psychobiological model Farley outlines four main aspects on Arousal Process I:

1. "The primary psychological motive based on arousal is the sensation- seeking motive. Sensation-seeking or avoiding is the

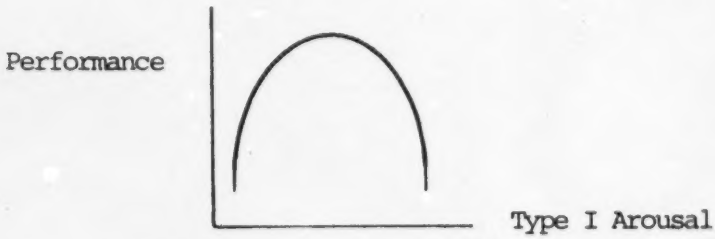
primary method to modulate Type I arousal " (Farley, 1981 p.9).

2. The source of arousal may be classified as intrinsic or extrinsic. Intrinsic arousal is trait-like and the main individual difference term, and might be viewed as a habitual level of arousal characteristic of the individual. Extrinsic arousal is manipulable and is an effect of stimulus characteristics. It is dependent on factors outside the individual. The sources of extrinsic arousal may be mental as well as overt.

3. The relationship between intrinsic arousal and stimulation-seeking is linear and negative, which implies that individuals low in intrinsic arousal seek stimulation to a higher degree than individuals with a high level of intrinsic arousal.



4. The relationship between Type I arousal and performance is in the form of an inverted U shaped function. This means that for effective psychological functioning the level of arousal ought to be at a medium level.



In short, there are two types of arousal, intrinsic and extrinsic where the former is trait-like in nature and the latter is manipulable. For effective functioning there should be a balance between the two within the individual, and for each individual this balance is found at different points on a continuum. The way to affect the balance is through manipulation of the extrinsic level of arousal by exposing the individual to various kinds of stimulation.

According to Farley's theory the optimal level of stimulation is reached when there is a balance between intrinsic and extrinsic arousal, and the point at which this level is reached is different for different individuals. One might, however, say that individuals low in intrinsic arousal need more stimulation than individuals with a high level of intrinsic arousal, but it seems impossible to describe exactly what level is best for a particular

person. The activity the person is involved in at a special time must to a high degree determine the level of stimulation that is best suited at that particular time. In regarding individuals as active, changing learners the optimal level of stimulation becomes something that the individual strives to generate through different activities, and what he is doing then is to match the intrinsic level of arousal with the extrinsic level. Farley means that through determining the individual´s intrinsic level of arousal one obtains a starting-point for research on what educational environment best fits different individuals, and he also has ideas how to create different learning environments for learners with different motivational styles.

Farley suggests that various aspects of the environment have different "arousal-potential". Among teacher characteristics extraversion, liveliness and loudness are examples of personal traits that have high arousal potential. Introversion, ponderousness and reservation, on the other hand, have low arousal-potential. When it comes to instructional characteristics, all methods that leave a lot of decision-making and initiative to the student reflect a high arousal-potential, while methods containing a high degree of structure have low arousal-potential.

The next question to be asked is how to quantify intrinsic and extrinsic arousal. As intrinsic arousal is a pure physiological variable a diversity of physiological measures might be used. Among the laboratory measurements used are skin-conductance, heartrate, muscle action potential, finger blood volume, EEG etc. (Farley, 1981). These measurements, however, are impractical to use in large-scale experiments, and therefore different scales of the tendency to seek stimulation have been developed (Zuckerman et al., 1964, Pearson & Maddi, 1966, Garlington & Shimota, 1964). These are all paper and pencil tests and are constructed to measure the individuals´ habitual level of intrinsic arousal. Extrinsic arousal, on the other hand, has been measured through a scaling-procedure of the arousal-potential of various categories in the environment, such as instructional characteristics in the educational system and teacher-characteristics.

In the psychobiological model of ATI that Farley suggests A stands for intrinsic arousal and T for treatable or extrinsic arousal. Consequently extrinsic arousal becomes the independent, manipulable component of overall arousal. It should be observed that the manipulation of extrinsic arousal involves both inner and outer factors. Fantasy for example is an inner factor that one might manipulate. This ATI-model permits the combination of different environmental features with intrinsic arousal. Through different combinations one might find that for different individuals the optimal level of arousal is not the same, and through these findings be able to adapt the treatment of an individual to his special needs. This makes it possible to predict how a certain treatment will affect an individual cognitively as well as affectively.

As intrinsic arousal is trait-like it is a relatively stable characteristics of an individual, and as a point of departure for research on this kind of individual differences one must find ways to assess the level of intrinsic arousal for the individual. One possible way to assess the habitual level of intrinsic arousal is to estimate it by the administration of a sensation-seeking scale, and the purpose of this study is to develop such a scale for pre-adolescent children.

3 Method

3.1 Construction of the scale

As a point of departure the sensation-seeking scale developed for undergraduates by Zuckerman et al. (1964) was used. This 34 item scale was analyzed in regard to its applicability with 12-13 year old Swedish children and thereafter adapted to this age group. The items were in forced-choice form, and both alternatives of each item were socially desirable in the original scale. In our scale we have paid special attention to social desirability by making both alternatives equivalent in content and linguistic construction. Studies of the effect of social desirability (Farley, 1967) and response set (Farley & Haubrich, 1974) in the sensation-seeking scale developed by Zuckerman et al. (1964) indicate that the influence of these psychological phenomena is minimal.

Questions concerning desires about jobs, preference for different kind of art, goals in life and various other items designed for adults were removed from the scale developed by Zuckerman et al.. Instead other items judged as more suitable for children of this age were added. Those were questions concerning things like going on excursions, riding a bike and participating in different activities that are common for children of this age. In all 14 of the 34 items in Zuckerman et al´s. scale were kept in the original form, while a couple of questions were adapted to the age-group by changing the object of consideration (for example car to bike). The rest of the items were constructed especially for the new scale. Those questions are, however, similar in their construction to the ones that Zuckerman et al. have used. Besides, 5 additional items were designed with the aim to measure social extraversion/introversion. All together the new Swedish scale consisted of 36 items (see appendix 1).

3.2 Administration of the scale

The Swedish scale was administered to 874 children in the sixth grade, among which 443 were girls and 431 were boys. It was given in connection with a learning-experiment, and in combination with the items intended to measure sensation-seeking items designed to measure the pupil´s attitude to school and learning were given. The two types of questionnaires were mixed and presented in one form as they were both designed as forced-choice questions. The reason for this course of action was that one scale is more easily administered. Besides, the mixture of items might diminish the tendency to answer in a similar fashion to items that are alike in content. In all the form consisted of 85 items.

The scale was presented to the pupils as questions concerning their attitude

to school and learning and also other things that were familiar to them. It took about 20 minutes to administer, and our impression is that the students found it easy and fun to fill out the form.

4 The dimensionality of sensation-seeking

In order to generate the original sensation-seeking scale Zuckerman et al. (1964) assumed that sensation-seeking is a unitary concept. Thus, they selected as items for the final form of the scale those loading .30 or greater on the principal unrotated factor. Farley, however, (1967) suggested that sensation-seeking is a multi-dimensional concept. He reanalyzed Zuckerman et al.'s original scale by duplicating the original procedures for development of the scale with a sample of British males, instead of a North American sample of both sexes as was used by Zuckerman et al.. Farley performed a principal component analysis on the resultant correlation matrix with ten factors beeing extracted.

Farley found 16 items loading .30 or greater in the first unrotated factor, and all those items indicated a relation to sensation-seeking in general. The second unrotated factor appeared to reflect interest in exciting sports, while the third contained items pertaining to preference for activity and strong physical sensations. The fourth factor appeared to reflect a liking for strong sudden sensations, whereas the fifth related to a preference for uncertanity and irregularity. The sixth factor pertained to a liking for variation in general, and the seventh to a preference for striving for goals that are difficult to reach. The eight factor was very similar in nature to the seventh, while the ninth contained items that relate to a preference for a high quantity of experiences. The tenth was very similar to the fifth factor. The loadings in factors six to ten were very small and few.

According to the analysis made by Farley the concept of sensation- seeking is multidimensional, but our impression is that the factors do not differ from each other to a great extent. In addition, Farley used a sample that consisted only of males, which is a fact that may have influenced the outcome of the factor-analysis. The question of unitarity or multidimensionality therefore needs further attention.

As we assert that it is important to further inquire into the question of dimensionality we have put an effort into using different factor-analytical procedures. In this context the problem of how many factors to extract, and what criteria to use for the number of factors to extract are basic. The most commonly used criteria are that of Kaiser (Guttman, 1958) and the scree-test suggested by Cattell (1967). In our analyses we started out using those criteria, but we want to insist on the necessity of considering other criteria as well. An absolute requirement and our main criterion for a specific solution to be choosen is factorial invariance in spite of procedure used in the analysis and over the sexes (Royce, 1971).

From a general point of view we also have the requirement that the factors should be logical and comprehensible and easily distinguishable from each

other. In addition there should be a sufficient number of loadings greater than .30 on each factor.

5 Procedures and results of the factor analysis

5.1 Procedures

The product-moment correlation matrix for the 36 items was subjected to principal component factor-analysis performed with a subprogram within the SAS system for data analysis (SAS Institute, 1979), with one to twelve factors beeing extracted. First the analysis was made for boys and girls together. The factor loadings were computed by the principal axis method and were rotated by the Varimax procedure for analytic rotation (Kaiser,1958) to approximate simple structure. Then the Promax procedure (Hendrickson and White, 1964) to oblique rotation was applied to the Varimax solutions. The structure of the factors and the item factor correlation patterns were then analyzed, and a comparison of the resulting matrices of loadings was made to test the stability of the factors that emerged in the different factor solutions.

The same procedure was then repeated with the data split up in two samples, of boys and girls separately. Finally, the resulting factor loading matrices for boys and girls were compared to each other and to the one for the whole sample. The different item factor correlation patterns were analyzed, and the factors that emerged in different factor solutions were contrasted to each other as well.

In the descriptions which follows, all loadings exceeding .20 are listed (see appendices 2 and 3), but in interpreting the nature of the factors only loadings of .30 or more are used.

Tables with the different factor patterns will be found in the appendices with an abbreviated item description and loadings specified. Summarizing tables are presented in the text.

5.2 Results for the total sample

In the analysis made on the total sample the number of factors extracted should be twelve according to Kaiser's criterion, since the first twelve factors all have latent roots greater than unity. These twelve factors accounts for 51 percent of the total variance. When inspecting the item factor correlation pattern in the twelve- factor solution the first impression is that there are very few loadings in each factor. This is the case independently of procedure of rotation used. The factor that obtains the most

loadings is factor six both with Varimax and Promax rotation. This factor, however, only has four loadings above.3 and they are all rather low anyway.

These results indicate that the twelve factor solution neither is comprehensible, nor does it contain a sufficient number of loadings in each factor. In the eleven and twelve factor solutions the distribution of loadings is similar to the one in the twelve factor solution, and the replicability of the factors across rotational method seems to be poor. The factors are generally weak and instable, and the criteria of order and comprehensibility are not met. This implies that we must search for a valid factor structure among the solutions with fewer factors extracted.

By means of visual inspection the nine, eight and seven factor solutions seem to have few and low loadings in general. In addition replicability of the factors across rotational method is poor. A substantial similarity between those solutions is, however, that the first factor has more numerous loadings. In interpreting the nature of this factor we can easily conclude that it seems to be a pure sensation-seeking factor. Nevertheless, the factor structures still are difficult to interpret.

A rapid inspection of the two to six factor solutions gives a hunch that a comprehensible and reasonable solution that fits the criteria may be found among these. Therefore we will examine those different patterns of factor loadings more closely and also interpret the nature of the factors that emerge. The best point of departure for this is, however, the two factor solution. Consequently we will start inspecting the two-factor solution and work through the different solutions. We will analyze the factor structure in terms of stability and content considering the different methods of rotation.

Table 1 shows the structure of factors in the two to six factor solutions. The pattern of loadings, communality, total variance and variance explained by each factor are presented in appendices (see appendices 2.1 - 2.5).

The first factor in the two-factor solution (see appendix 2.1) contains items that pertain to the dimension of sensation-seeking in general. This factor remains relatively stable regardless of how many factors that are extracted. Factor two in this solution refers to items that relate to a preference for new and different sensations and a liking for variety in general. It might be labelled "New Experiences". This factor remains stable through the three and four-factor solutions, but splits up in factors two, four and five in the five-factor solution.

In the three-factor solution (see appendix 2.2) factor one and two are similar to those in the two-factor solution as mentioned above. The third factor reflects a social extraversion/introversion dimension. It remains stable all through the six-factor solution. When it comes to the four-factor solution (see appendix 2.3) the first three factors have been described above as all of them were stable through this factor. The fourth factor is defined as an "Outgoingness factor", as the content refers to taking initiative in different situations. A substantial element is, however, a preference for engaging in activities together with other people. This factor is not stable, and in the five and six factor solutions the loadings on those same items are not present. The loadings in general are low. In the five factor solution (see

Table 1. Interpreted factors in the two to six factor solutions.

Factor no.	Factor solutions 2	3	4	5	6
1	Sensation seeking in general	Sensation seeking in general	Sensation seeking in general	Sensation seeking in general	Sensation seeking in general
2	New Experienes	New Experiences	New Experiences	Familiarity	Dependability
3		Social Extra-version	Social Extra-version	Social Extra-version	Social Extra-version
4			Outgoing-ness	New people	New people
5				New Experiences	New Experiences
6					Outgoing ness

appendix 2.4) the pattern of loadings looks somewhat scattered. The first and third factor remain the same as before but the second factor splits up into factor two, four and five. Factor two pertains to the preference for familiar people and activities, whereas factor four seems to reflect a liking for new people. The fifth factor has occasional relatively high loadings on items that reflect a preference for new experiences.

The nature of the factors in the six-factor solution is not easy to interpret as the loadings become more confusing when some of the earlier rather comprehensible factors split up into different smaller factors (see appendix 2.5). In addition, the loadings in general are low. So far, the three-factor solution seems to be the most valid for the criteria. It is reasonable and comprehensible, and stable over different solutions and methods of rotation. In addition, it has a sufficient number of loadings above .30 in each factors.

5.3 The three factor solution

Table 2. The three factor solution for the total sample.

Factor I	Factor II	Factor III
Sensation-seeking in general	New Experiences	Social Extra-version

The three factor solution (see appendix 2.2) probably gives a good discription of the dimensionality of the concept sensation-seeking. This conclusion is based on the analyses of the factor solutions for the sample of boys and girls together. Before we analyze the data for boys and girls separately we will make a more careful presentation of the factors that emerge in the three-factor solution for the total sample.

Factor I Sensation-seeking in general. This factor has the highest loading on item 29 which is a question on hunting lions in Africa. Other items that obtain high loadings are 12, 5 and 1. Those are about parachute-jumping, dangerous things and the liking for exploring new places alone.

Factor II New experiences. This factor has the highest loadings on items 7 and 18. Those are question on attitude to performing in plays and the liking for new music. Other items that obtain high loadings in this factor are 32 and 33, which reflect a preference for beeing with new people that engage in new activities.

Factor III Social extraversion. In this factor the most potent marker is item 26 which reflects the attitude toward being among many people. In addition this factor has relatively high loadings on item 11, 22 and 2. These are questions on the preference for living with many people around or by yourself, how you like going to a discoteque and on the preference for being in small or large groups of people.

In summary the factor-analyses for the total sample point to that sensation-seeking might be multidimensional. Our result indicate that sensation-seeking should be treated as a three-dimensional concept, which is not in line with Farley's (1967) suggestion that it should consist of ten factors.

We have not yet, however, considered the main criterion, that of invariance

across the sexes. Before finally deciding on what solution to accept this criterion must be paid attention to.

6 Factor-analyses for the sexes separately

6.1 Procedures

The analyses for the sexes separately were accomplished in exactly the same way as for the sample as a whole. Those analyses produced substantially the same factors for the boys as for the total sample. The results for the girls differ, however, from those for the boys and the total sample. In order to understand the differences and what they might mean for the dimensionality of the concept sensation-seeking we will take a closer look at the different factors that emerge for boys and girls separately.

Originally factor analyses were done with two to twelve factors extracted for both samples. When analyzing the resultant factor loading matrices one finds that the factor structure in the five to twelve factor solutions is confusing. Hence it does not seem fruitful to make further analyses and interpretations of those factors as it probably will not add any information. Therefore we will concentrate on a deeper examination of the factor structure in the two to four factor solutions (see appendices 3.1, 3.2, 3.3). Attention will be paid to both high and low loadings. High loadings are of interest primarily as they define the nature of the factor. The smaller loadings, however, are also of interest in confirming the nature of the factor if they appear for both sexes. They may also highlight differences between the sexes where certain items have appreciable loadings for one sex only.

All loadings exceeding .30 are listed. Besides loadings exceeding .20 are listed when they appear on an item where it has a higher loading for the other sex. In interpreting the factors primarily the loadings of .30 and greater are used. The order of the factors is arbitrary while the variance accounted for by each factor is of importance.

6.2 Factor structure in the analyses for the sexes separately

The nature of the first factor in the two-factor solution for boys and girls is markedly different (see appendix 3.1). The boys have high loadings on items that are exciting one-man activities. The central characteristic for the girls on the other hand, is a social dimension even if they in addition

Table 3. Factor pattern in the two to four factor solutions.

The two factor solution		
Factor number	Boys	Girls
I	Sensation-seeking in general	Social Sensation-seeking
II	Escape	Sensation-seeking in general
The three factor solution		
Factor number	Boys	Girls
I	Sensation-seeking in general	Social Sensation-seeking
II	New Experiences	Sensation-seeking in general
III	Social Extraversion	New Experiences
The four factor solution		
Factor number	Boys	Girls
I	Sensation-seeking in general	Sensation-seeking in general
II	Escape	Social Sensation-seeking
III	Social Extraversion	Familiarity
IV	Social Sensation-seeking	Change

have loadings on items that reflect a liking for excitement. Items with smaller loadings show, however, a similarity between boys and girls, as those items refer to exciting activities combined with a liking for doing things together with other people.

Factor two is one of escape from every-day life for the boys, whereas it refers to sensation-seeking in general for the girls. This factor has no extremely high loading for neither sex. The first factor for the girls is the most potent, both in relation to the first factor for the boys and to factor two, for both sexes.

In the three-factor solution factor one for the boys and factor two for the girls are similar; both are factors of sensation-seeking in general. In the sample of girls this factor is the strongest of the three factors as it explains a higher proportion of the variance than the other two.

In the four factor solution sensation-seeking in general comes out as the first factor in both samples. It is interesting to notice that for the girls it accounts for about 3 percent of the total variance, while it is not as strong for the boys. In fact, factor two is strongest in the sample of boys, but the difference as it comes to amount of variance accounted for is very small between the first three factors for the boys. In the four factor solution for boys the factors account for 25 percent of the total variance, while in the sample of girls 26 percent of the total variance is explained.

To sum up the first observation to make is that factorial invariance across the sexes is not present. The marked difference of the components in the analyses for boys and girls separately, and the instability of both when further analyses were made suggest that different psychological mechanisms are predominant within the field of sensation-seeking for boys and girls. i.e. both sexes do show individual differences in sensation-seeking tendency, but it finds expression in different directions. The content of sensation-seeking is different for boys and girls. When inspecting the constellation of factors in the two to four factor solutions it is interesting to notice that the pattern of factors is more stable for the boys than for the girls. For the boys sensation-seeking in general is a strong factor across the different solutions, whereas sensation-seeking in general and social sensation-seeking alternate as the strongest factor for the girls. As a rule it seems that all factors for the girls contain elements that belong to the social domain. The social content, however, is present to different degrees, which makes the factors difficult to interpret at times. The nature of the factors in the sample of boys on the other hand is more delimited and clearcut. Escape is a recurrent factor in the sample of boys, which is not present in that of girls, whereas familiarity and change are factors that are exclusive for the girls.

Earlier the suggestion was made that sensation-seeking should be considered as a three-dimensional concept, based on the analyses of the total sample. The results of the analyses for the sexes separately, however, has opened our eyes to the fact that this is probably a delusion. What now remains is to take a closer look at the one factor solutions, and examine the possibility of using one general factor in the sensation-seeking scale. Before that we will, however, contrast the three factor solutions for the total sample, the sample of boys and that of the girls, to further illuminate the sex differences that come forth.

6.3 A comparison of the three factor solutions

The first factor is closely similar for the sample of boys and the total sample. All items with a loading greater than .41 in the total sample are present with loadings greater than .30 in the sample of boys. (see appendix 2.2 and 3.2). Items that have high loadings are typically adventurous one-man activities. For the boys this factor contains only one item with a social implication. For the total sample this factor retains a few items that reflect the tendency to escape everyday-life, but those have lower loadings. In the sample of girls this factor contains mainly items with general social

Table 4. The three factor solution.

Factor number	Total	Boys	Girls
I	Sensation-seeking in general	Sensation seeking in general	Social Sensation-seeking
II	New Experiences	New Experiences	Sensation-seeking in general
III	Social Extra-version	Social Extra-version	New Experiences

implications (see appendix 3.2), and it has only one item in common with the sample of boys and the total sample. This item pertains to the preference for reading about violence.

The second factor for the boys is one of "new experiences" which clearly reflects the liking for novel events. For the total sample this factor is closely similar to that of the boys, as all items with high loadings are present in both. A difference, however, is that in the sample of both sexes a few items that refer to the preference for contacts with new people are present. In the sample of girls this factor is one of sensation-seeking in general, very similar to factor one for the other samples.

The third factor pertains to the social extravesion/introversion dimension in the sample of boys and in the total sample. Here the agreement across samples is not as total as in the other factors, but the most prominent markers are similar. A difference is that for the boys this dimension is more clearcut than for the total sample. For the girls this factor is one of "new experiences" similar to factor two for the other samples. It has, however, more of socially directed content.

When considering variance explained by the different factors in the three samples the first impression is that the factors generally are weak, as they account for but 1 to 4 percent of the variance.

They do, however, differ in strength to some degree. Especially for the girls factor two, sensation seeking in general, is markedly stronger than the other two. It explains 3 percent of the variance, while factor one and three explain respectively 2.5 and 2.1 percent. For the boys, on the other hand, the difference in strength between the factors is minimal, as they all account for about 2.5 percent of the variance. In the total sample, where factor one explains 3.7 percent of the total variance, the difference in strength is more pronounced, as the second and third explains 2.3 and 1.2 percent respectively. In the three samples the first factor explains about 10 percent of the total

Table 5. Variance explained in the three-factor solution.

	Total sample	Boys	Girls
Factor I	3.66	2.53	2.55
Factor II	2.13	2.47	3.03
Factor III	1.19	2.54	2.13

variance, while the three factors taken together account for about 21 percent.

The general conclusion from this comparison is that the scale with three dimensions would mainly consist of the same factors for the sample of both sexes and for that of boys, whereas it for the sample of girls would contain somewhat different factors. An observation worth considering is, however, that the scales would be fairly similar in content as the dimensions of sensation-seeking and new experiences are present in all factor structures. In view of this similarity it was decided to ascertain the possibility to use one general factor based on the total sample in the development of the sensation-seeking scale.

6.4 The one factor solution

The first impression of the one factor solutions is that the three samples display a similar pattern of loadings on this factor. Items with high loadings are the ones that describe typically adventurous and thrill-seeking types of activities (see table 6). Examples of those are hunting lions in Africa, try parachuting and doing dangerous things. It is quite evident that this factor is relatively stable, as it can be found with about the same content up till the nine factor solution for the total sample. In the sample of boys it is also stable, at least to the four factor solution. For the girls, on the other hand, the items that load on this factor seem to split up in the factor of sensation-seeking in general and social sensation-seeking in the other solutions. In all, most items have loadings above .30 in the three samples.

To disclose the content of the items that do not belong with this factor, we will make a short examination of the items with low loadings, i.e. below .20. It is a little bit surprising to find that the items with low loadings are almost exactly the same in the three samples. Not surprising is, however, that all the items that originally were added to Zuckerman et al´s scale with the purpose to measure social extraversion/introversion are to be found among those. In addition it might be mentioned that many of those items can be found in factor three in the different solutions for the total sample and for the boys. In the sample of girls some of those items can be found in the strong factor of social sensation-seeking.

Table 6. Factor loading matrix for the one factor solution (Varimax).

	Abbreviated item descriptions	Boys and Girls	Boys	Girls
1	Show me around in a new place	-.28	-.20	-.25
2	Fun going to a discoteque	.25	.37	.25
3	Fun going to a party	.17	.16	.20
4	Booring to see the same old faces	.32	.29	.36
5	Like to do dangerous things	.51	.55	.42
6	Taking the same route	-.28	-.31	-.25
7	Rather see others perform	-.09	-.22	-.09
8	Like to eat familiar dishes	-.21	-.28	-.22
9	Exciting to bike fast	.43	.42	.38
10	Not contact strangers	-.29	-.32	-.29
11	Prefer living in the woods	-.07	-.06	-.15
12	Like to try parachuting	.55	.49	.56
13	Like to be seal	-.17	-.17	-.09
14	Exciting to be hypnotized	.46	.47	.45
15	Preplanned route and destination	-.28	-.34	-.22
16	Plunge gradually into cold water	-.38	-.33	-.38
17	Like strong-flavoured candy	.35	.29	.36
18	Like new and unusual music	.08	.16	.03
19	Like to go for a walk alone	.09	.10	-.00
20	Like ingenuous friends	.16	.22	.12
21	Fun to shop in the rush-hour	.26	.34	.38
22	Like calm friends	-.41	-.41	-.48
23	Prefer canoing with a friend	-.20	-.14	-.23
24	Not reading about violence	-.31	-.27	-.29
25	Seldom get boored	-.23	-.20	-.28
26	Like many people around	.24	.20	.35
27	Like to move often	.33	.24	.40
28	Don´t mind changing plans	.12	.11	.15
29	Hunting lions in Africa	.58	.54	.55
30	Pondering for a long time	.08	.14	.07
31	Exciting with unexpected things	.26	.24	.32
32	People that do different things	.23	.30	.23
33	Spending time with one friend	-.43	-.42	-.50
34	Jump into ice-cold water	.35	.48	.38
35	Joining a travelling circus	.35	.47	.30
36	Fantasies about dangerous things	.41	.31	.46
	Variance explained	3.66	3.71	3.77
	Total variance explained			10%

To determine the similarity of the item factor pattern across sexes the loadings were ranked for the males and the females, and the two sets of ranks were correlated using the Kendall coefficient of concordance (Siegel, 1956). The coefficient of concordance W was .78, indicating that there is a concordance between the rankings of questions among boys and girls in this

general factor of sensation-seeking. This concordance is significant on the 5 percent level ($X = 32.8$, $df = 21$). As it was not exactely the same items that had loadings greater than .30 for the boys and the girls all items that had a loading of this size for either sex were included in the computations. In consistency with this the scale should include 22 items. There were, however, items that had loadings greater than .20 in the analysis for the total sample and loadings above .20 in both analyses for the sexes separately. To be consistent chose should be included in the scale.Therefore the revised scale consists of 26 items.

The final scale for 12-13 year old children is constructed to measure an unitary concept of sensation-seeking. It consists of 26 items in all(see appendix 4). Seventeen items for the females and sixteen for the males loaded .30 or greater on the unrotated general factor, whereas sixteen items had loadings greater than .30 on this factor for the total sample.

7 Conclusion

After having analyzed the different solutions and their implications for the dimensionality of sensation-seeking we must conclude that the most comprehensible and fruitful solution is the one-factor solution. This conclusion takes us back to where Zuckerman started and means that sensation-seeking should be considered as a unitary concept.

The main reason why we cannot allow us to reflect upon sensation-seeking as multidimensional is that the factor structure is not invariant across the sexes when extracting more than one factor. As mentioned before the most crucial criterion in the analysis has been that of invariance. The principal criterion in deciding upon how many factors to extract has been both quantitative and qualitative. When looking at the results of the analyses in the different samples they seem to indicate that a three-factor solution might be reasonable and comprehensive. By making a closer inspection of the samples of boys and girls separately, however, and interpreting the factors, one finds that the factor patterns for boys and girls are indeed different.

In all samples the three-factor solution seemed to be the most useful, but by making a closer examination we found that the contents of the factors were different for the sexes. Here the factors were not invariant in any sense. We could neither identify the same factors in solutions with different number of factors extracted nor identify the same factors for boys and girls. The analysis of the data for the total sample with different factorial procedures used was in fact not very informative in describing the dimensionality of the concept sensation-seeking, as the main criterion, that of invariance across the sexes, did not support the conclusion about multidimensionality which became the epilogue of those analyses.

8 Discussion

It has already been concluded that the sensation-seeking scale developed in this study will consist of one general factor of sensation-seeking. The concept sensation-seeking is accordingly considered as uni-dimensional, measuring the individuals general tendency to seek sensation. This is true when taking account of the total sample of preadolescent boys and girls. It seems, however, that different psychological mechanisms may be at work in sensation-seeking for boys and girls. Individual differences in sensation-seeking probably rely on the same underlying mechanism in both boys and girls, but the direction and content of sensation-seeking differs between the sexes.

Evidently this concept is more multi-facetted for the girls, as it in most factor patterns seems to pertain to a combination of a social dimension and one of pure sensation-seeking. The social dimension is apparently present in most of the factors that emerge for the girls, and there are few factors that do not contain any item with social content. For the boys, on the other hand, the social dimension appears to be strongly connected with qualities originating within the person, bound to the power of initiative and outgoingness. This dimension is, however, not as pervasive in influence as for the girls.

When analysing a scale with many factors, with a mixed sample, the sex differences that do exist might erase each other. It is, however, of paramount importance to be aware of differences between the sexes. In order to reveal them it is therefore recommendable to do separate analyses for the sexes, before making the desicion on how many factors to extract. In addition one should pay careful attention to the criterion of factorial invariance across the sexes.

Farley (1974) has proposed that the sex differences might be age-related. In a study on response set in the measurement of stimulation-seeking he suggests that stimulation-seeking differences emerge in adulthood, but not in adolescence. In the study he showed that adult males scored generally higher on Thrill and Adventure Seeking and Disinhibition than females. He then compared this to a study by Farley and Cox (1971), where no significant differences between adolescent males and females in four age-levels were found. Our results, however, show that the differences do exist in adolescence. Farley suggests a developmental trend in connection with sensation-seeking, where the sexes might display different developmental patterns. In order to make comparisons across ages, however, non-verbal measures of sensation-seeking must be developed for the purpose of eliminating differences that are due to developmental linguistic and language habit differences.

In spite of the sex-differences the scale with one general factor seems to be defensible. The main reason for this conclusion is the concordance between the rankings of loadings for boys and girls in this first factor. This concordance demonstrates that the sexes in fact do have a considerable amount of common elements in the dimension of sensation-seeking. In addition, the first factor of sensation-seeking in general is stable over solutions in the total sample and in the sample of boys, and it shows rather good stability for

the girls.

The alternative to one common scale for boys and girls would be different scales for the sexes with more than one factor extracted. Such scales would be difficult to administer, and in addition they could not be compared to each other, as they would consist of different items. Furthermore it seems unnecessary to divide the construct of sensation-seeking in to more than one factor, as the gain in information probably will be minimal and might even be confusing.

To summarize, it is important to be aware of basic differences that do exist between the sexes. They are important to have in mind when discussing results on the scale and in the process of drawing conclusions. The differences that exist are of course interesting pér se, but to penetrate them and relate them to other factors known about the individual is a matter apart from the development of a scale.

The possible theoretical and practical implications of sensation-seeking tendency for learning and instruction will be the subject of further studies. In order to acquire a deeper understanding of sensation-seeking, and its possible effects on the interaction between the individual and his environment, it is necessary to obtain information on how sensation-seeking tendency is related to other variables. The sample in the present study have also been subjects of a study on the structure of cognitive abilities (Gustafsson et al. 1981). Data collected in this study will be utilized to ascertain relations between sensation-seeking tendency and other variables.

Cognitive style is one such individual difference variable, which represents "a person´s typical modes of perceiving, thinking and problem solving" (Messick, 1969, p.329). Field independence versus field dependence is one of the most investigated conceptualizations of cognitive style. These concepts stand for "the extent to which the person percieves analytically" (Witkin et al. 1977, p.7). A person who is field-independent experiences items as more or less discrete from the surrounding field, whereas a field dependent person experiences items as embedded in the field. It has been shown that individual differences in this dimension are related to other personality factors such as social orientation, body-concept, sense of separate identity and nature of defenses.

Zuckerman et al. (1964) demonstrated a positive relationship between sensation-seeking and field independence. Farley, however, is doubtful to whether this relationship is reliable, and argues that "it probably contributes little to explicating the nature of either variable" (Farley, 1974, p. 330). In a following study we will further analyse the relationship between sensation-seeking tendency and field independence.

Another personality trait that has been tied to the concept of arousal is extraversion versus introversion (Eysenck, 1976). A spontaneous reaction when first looking at different measures of sensation-seeking is that many of the items could be designed to measure the factor of personality named impulsivity, which is closely connected to the factor social extraversion. Further studies will have to prove a relationship between sensation-seeking and social extraversion. One interesting outcome of the development of the scale is that a factor of social extraversion emerges for the boys and in the

total sample, but not for the girls.

In a study on arousal and cognition Braverman and Farley (1978) postulates that differential encoding or information-processing strategies may be at work within individuals high and low in the stimulation-seeking motive. They argue that high stimulation-seekers use an encoding-process that involves translation of pictoral information into verbal units. This in turn entails the involvement of the left hemisphere. Low stimulation-seekers, on the other hand, use an iconic storage of pictoral information, thus depending on their right hemisphere to a higher degree. This theory might be tested by relating results on the sensation-seeking scale to test-results on spatial tests. and possibly reveal motivation/sensation-seeking interactions.

In the process of development of an instrument to measure individual differences the question of construct validity is central. Construct validity implies an intimate knowledge of the psychological concepts that determine the test-scores, and the ability of the researcher to describe in psychological terms the differences that evolve (Cronbach, 1970). To acquire this type of validity a well established theory ideally should be present, that denotes what concepts may properly be used to interpret the test-scores. The interpretation of a test is, however, built up gradually and "the process of construct validation is the same as that by which scientific theories are developed" (Cronbach, 1970).

Farley's theory of the sensation-seeking moti.. .y now stands on a rather firm foundation, and several studies have his theory as theoretical basis (Braverman & Farley, 1978, Farley, 1967, Farley, 1971, Farley & Cox, 1971, Farley and Haubrich, 1974). Those studies concentrate on different aspects of sensation-seeking, and use somewhat different methodology. This is in accordance with accepted lines of action to obtain construct validity. Nevertheless, qualitative research, like interviews and observations, is needed in addition to establish a deeper understanding of the concept.

As a parenthesis some viewpoints on Farley's general theory of the stimulation-seeking motive will be brought up. As related earlier Farley's psycho-biological model of arousal builds upon the hypothesis that the overall arousal level depends jointly on external environmental factors that affect the individual and the internal state of arousal. The objective for the individual is to reach an optimal level of arousal, which is suggested to lie in the intermediate range of possible values.

Farley treats intrinsic arousal as a relative stable characteristic for an individual, comparable with habitual level of arousal, which is represented by A in the model. Extrinsic arousal is, on the other hand, a factor that is easily impressionable by rearrangements in the environment, and is accordingly represented by T in the model.

It seems that one brick is missing in the construction. In a resting state the optimal level of arousal is equivalent with the intrinsic level. As soon as the individual engages in any kind of activity, however, the intrinsic level of arousal must be changed in the direction of the optimal level for that special actvity, and is no longer equivalent with that of the habitual level. Another concept must be introduced to bridge the gap between habitual

level of arousal and the level of arousal that is present when the individual is engaged in an activity. As a suggestion one might call this level of arousal "state arousal". What should be treated in the ATI-model then is not the habitual level of arousal but the "state arousal". This is a consequence of the fact that one can not as a rule start at the level where the individual habitually stands. This implies that one must pay attention to elements in the environment that influences the individual when making an ATI-experiment and estimate his "state arousal".

The instrument developed in this project is intended for assessing tendency to seek stimulation. What is measured then is the individual´s "intrinsic arousal", which might be viewed as an estimation of the rank between individuals in sensation-seeking behavior.

Furthermore the orientation of an individual in his environment is determined by many factors that are intervowen in a complex pattern. Duffy (1957) wrote: "A tendency toward a high degree of arousal does not determine which aspects of the environment an individual will have a tendency to approach"(Duffy, 1957, p. 272). When realizing ATI-research in the learning environment one must be aware of the complicated interactions that might exist, and be careful to find out what aspects of the environment that have arousal-potential for the individual.

Another quality that also might be taken into consideration is the speed with which an individual is able to change state of arousal from the habitual level to "state arousal". This might be especially important to be aware of in the transition of results from ATI-experiment to everyday-life in school, since success in school to a high degree is dependent on the ability to succumb fast to a new task.

The most important outcome of this study is the conclusion that sensation-seeking should be considered uni-dimensional, which has resulted in a sensation-seeking scale based on one general factor of sensation-seeking. Further studies will show the relation between the sensation-seeking tendency and other differential psychological variables. Simultaneously the value of knowing a student´s tendency to seek stimulation will have to be proven, by making experiments with instructional features of different "arousal potential" as independent variable. Hopefully the ambition to wind up some of the mysteries of motivation in school will have a point of departure in the present study.

REFERENCES

Braverman, M.T., & Farley, F.H. The stimulation-seeking motive and structural effects in the comprehension of film. Educational Communication & Technology, 1978, 26, 321-327.

Cattell, R.B. The theory of fluid and crystallized intelligence. Psychological Bulletin, 1967, 37, 209-224.

Cronbach, L.J. Essentials of psychological testing (3 rd ed.). New York: Harper and Row, 1970.

Cronbach, L.J., & Snow, R.E. Aptitudes and instructional methods: A handbook for research on interactions. New York: Irvington, 1977.

Duffy, E. The psychological significance of the concept of "arousal" or "activation". Psychological Review, 1957, 5, 265-275.

Eysenck, H.J. The measurement of personality. Lancaster: MTP Press Limited, 1976.

Farley, F.H. Social desirability and dimensionality in the sensation- seeking scale. Acta Psychologica, 1967, 26, 89-96.

Farley, F.H. Measures of individual differences in stimulation and the tendency towards variety. Journal of Consulting and Clinical Psychology, 1971, 37, 394-396.

Farley, F.H. Sensation-seeking motive and field independence. Perceptual and Motor Skills, 1974, 38, 330.

Farley, F.H. Basic process individual differences: A biologically- based theory of individualization for cognitive, affective, and creative outcomes. In F.H. Farley & N.J. Gordon (Eds.) Psychology and Education - The state of the union. Chicago: National Society for the study of Education, 1981. (Draft)

Farley, F.H., & Cox, Sr. O. Stimulus-seeking motivation in 1971, 6, 207-218.

Farley, F.H., & Haubrich, A.S. Response set in the measurement of stimulation-seeking. Educational and Psychological Measurement, 1974, 34, 631-637.

Garlington, W.K., & Shimota, H.E. The Change-Seeker Index: A measure of the need for variable sensory input. Psychological Reports, 1964, 14, 919-924.

Gustafsson, J-E., Lindström, B., & Björck-Åkesson, E. A general model for the organization of cognitive abilities. Reports from the Department of Education, University of Göteborg, no.6, 1981.

Guttman, L. Some necessary conditions for common factor-analysis. Psychometrika, 1954, 19, 149-161.

Guyton, A.C. Function of the human body. Philadelphia: N.B. Saunders

Company (third ed.), 1969.

Hendrickson, A.E., & White, P.O. Promax: a quick method for rotation to simple structure. British Journal of Statistical Psychology, 1964, 17, 65-70.

Kaiser, H.F. Varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.

Kluckhohn, C., & Murray, H.A. Personality in Nature, Society, and Culture. New York: Knopf, 1948.

Messick, S., Measures of cognitive styles and personality and their potential for educational practice. In K. Ingenkamp (Ed.) Developments in educational testing. London: University of London Press, 1969.

Pearson, P.H., & Maddi, S.R. The similes preference inventory: Development od a structured measure of the tendency toward variety. Journal of Consulting Psychology, 1966, 30, 301-308.

Royce, J.R. The conceptual framework for multi-factor theory of individuality. In J.R. Royce (Ed.) Multivariate analysis and psychological theory. London: Academic Press, 305-407. 1971.

SAS Institute, SAS User's Guide 1979 Edition, Raleigh, North Carolina: SAS Institute, 1979.

Witkin, H.A., Moore, C.A., Goodenough, D.R. & Cox, P.W. Field dependent and field independent cognitive styles and their educational implications. Review of Educational Research, 1977, 47, 1-64.

Siegel, S. Nonparametric statistics. New York: McGraw-Hill, 1956.

Zuckerman, M., Kolin, E.A., Price, L., & Zoob, I. Development of a sensation-seeking scale, Journal of Consulting Psychology, 1964, 28, 477-482.

Zuckerman, M. Dimensions of sensation-seeking, Journal of Consulting and Clinical Psychology, 1971, 36, 53-60.

Appendix 1

Questions for the development of a sensation-seeking scale

1. A I prefer someone to accompany me and show me around when I come to a new place.
   B I like to explore a new place by myself.

2. A It is fun to go to a discoteque.
   B I think it is too noisy on a discoteque.

3. A I always think it is fun to go to a party.
   B Sometimes I think it is tiresome to go to a party.

4. A It is booring to see the same old faces every day.
   B I like the comfortable familiarity of seeing the same people everyday.

5. A Sometimes I like to do dangerous things.
   B A sensible person avoids doing dangerous things.

6. A I prefer taking the same route every time I go to a place.
   B Sometimes I take a different route to a place I often visit, just for the sake of variety.

7. A I rather see others perform than doing it myself.
   B I think it is fun to perform in plays at school.

8. A I like to eat familiar dishes that I know taste well.
   B I think it is exciting to eat food that I have never tasted before.

9. A I think it is exciting to drive my bike as fast as I can down a hill.
   B It is dangerous to drive a bike real fast down a hill.

10. A I rather not contact strangers.
    B I enjoy contacting people that are new to me.

11. A I would prefer living far away in the woods where it is calm and peaceful.
    B I would prefer living in town where something always is happening.

12. A I would like to try parachute jumping.
    B I would not like to try parachute jumping.

13. A If I wasn't a man I would like to be a seal in a colony.
    B If I wasn't a man I would like to be an eagle on a cliff.

14. A It would be exciting to be hypnotized.
    B I would not like to be hypnotized.

15. A When I go for a picknick I want to plan the route and destination beforehand.
    B I prefer picknicks where neither destination nor route is planned in advance.

16. A When I am going to take a swim in a cold lake I plunge gradually in order to get used to the water.
    B When I am going to take a swim in a cold lake I jump or dive directly into the water.

17. A I like candy that has such a strong flavour that one gets a chock tasting it.
    B I like candy that has a moderate flavour.

18. A I like new and unusual music.
    B I would rather listen to the same kind of music all the time.

19. A I like to go for a walk in the woods all by myself.
    B I like to go for a walk in the woods with my friends.

20. A I like to be with friends that find new things to do all the time.
    B I would rather do the same thing all the time with my friends.

21. A I think it is fun to go to a shopping-center in the rush-hour.
    B I can't understand people who like to shop in the rush-hour.

22. A I prefer friends that are calm and even tempered.
    B I prefer friends that are impulsive and hot-headed.

23. A I would prefer to spend a calm evening canoing with a friend.
    B I would prefer spending an evening with a bunch of friends riding a motorboat.

24. A I don't like to read about violence in magazines.
    B I think it is exciting to read about violence in magazines.

25. A I seldom get boored and don´t mind doing the same thing for a long period of time.
B I easily get boored and prefer to be engaged in many things at the same time.

26. A I feel good when there are many people around.
B I feel good when there are not so many people around.

27. A I would like to move often and live in many different places when I become grown-up.
B I would like to live in the same place all the time when I become grown up.

28. A I don´t mind changing something that I have planned.
B I often feel irritated when I have to change something that I have planned.

29. A It would be exciting to hunt lions in Africa.
B It seems dangerous to hunt lions in Africa.

30. A Sometimes I can ponder on a thing for a long period of time.
B. I find it difficult to think of the same thing for a long period of time.

31 A. I think it is fun and exciting when something unexpected happens.
B I don´t like when something unexpected happens.

32. A I enjoy being with people who engage in strange and different activities.
B I don´t enjoy being with people who engage in strange and different activities.

33. A I feel most comfortable when I am with people that I know well.
B I think it is exciting to be with people that are new to me.

34. A I think that I would like to take a sauna in the winter-time and plunge into an ice-hole.
B It doesn´t seem nice at all to plunge into an ice-hole when you take a sauna in the winter-time.

35. A I think I would enjoy joining a touring circus.
B I think it would be tiresome to join a touring circus.

36. A I often dream of doing exciting and dangerous things.
B Most of the time I dream of doing quite ordinary things.

Table I

Appendix 2.1

Factor pattern in the two factor solution (Varimax)

	Factor	I	II	h
	Abbreviated item descriptions			
1	Show me around in a new place	-.33		.11
2	Fun going to a discoteque			.05
3	Fun going to a party	.21		.05
4	Booring to see the same old faces	.30		.10
5	Like to dangerous things	.55		.30
6	Taking the same route		-.40	.17
7	Rather see others perform		-.45	.22
8	Like to eat familiar dishes		-.45	.20
9	Exciting to bike fast	.52		.27
10	Not contact strangers		-.38	.16
11	Prefer living in the woods			
12	Like to try parachuting	.51	.20	.30
13	Like to be a seal			
14	Exciting to be hypnotized	.38	.27	.22
15	Preplanned route and destination		-.35	.14
16	Plunge gradually into cold water	-.37		.15
17	Like strong-flavoured candy	.38		.15
18	Like new and unusual music		.48	.27
19	Like to go for a walk alone			
20	Like ingenous friends		.28	.08
21	Fun to shop in the rush-hour	.40	.16	
22	Like calm friends	-.41		.18
23	Prefer canoing with a friend	-.38	.29	.23
24	Not reading about violence	-.46	.20	.25
25	Seldom get boored	-.32		.11
26	Like many people around	.25		.07
27	Like to move often	.33		.12
28	Don´t mind changing plans		.28	.08
29	Hunting lions in Africa	.55	.20	.34
30	Pondering for a long time		.33	.11
31	Exciting with unexpected things		.24	.09
32	People that do different things		.45	.20
33	Spending time with one friend	-.28	-.38	.22
34	Jump into ice-cold water	.34	.32	.22
35	Joining a travelling circus	.20	.36	.17
36	Fantasies about dangerous things	.32	.28	.18
	Variance explained	3.32	2.47	
	Total variance explained			16%

Table II Appendix 2.2

Factor pattern in the three factor solution (Varimax)

	Factor	I	II	III	h
	Abbreviated item descriptions				
1	Show me around in a new place	-.45			.24
2	Fun going to a discoteque		.24	-.48	.29
3	Fun going to a party			-.28	.08
4	Booring to see the same old faces	.22		-.24	.12
5	Like to dangerous things	.58			.34
6	Taking the same route		-.38		.17
7	Rather see others perform		-.48		.26
8	Like to eat familiar dishes		-.45		.21
9	Exciting to bike fast	.50			.28
10	Not contact strangers		-.40	.20	.20
11	Prefer living in the woods			.52	.29
12	Like to try parachuting	.56			.34
13	Like to be a seal	-.30		-.23	.15
14	Exciting to be hypnotized	-.30		-.23	.22
15	Preplanned route and destination	-.20	-.32		.15
16	Plunge gradually into cold water	-.39			.16
17	Like strong-flavoured candy	.37			.15
18	Like new and unusual music		.49		.26
19	Like to go for a walk alone	.24		.40	.22
20	Like ingenous friends		.29		.09
21	Fun to shop in the rush-hour	.28		-.32	.18
22	Like calm friends	-.22		.47	.29
23	Prefer canoing with a friend	-.20	.26	.41	.28
24	Not reading about violence	-.40	.22		.25
25	Seldom get boored	-.21		.27	.13
26	Like many people around			-.58	.35
27	Like to move often	.29			.12
28	Don't mind changing plans		.28		.08
29	Hunting lions in Africa	.65			.44
30	Pondering for a long time		.31		.13
31	Exciting with unexpected things		.23		.08
32	People that do different things		.46		.21
33	Spending time with one friend		-.41	.34	.31
34	Jump into ice-cold water	.37	.29		.23
35	Joining a travelling circus	.20	.35		.17
36	Fantasies about dangerous things	.41	.23		.23
Variance explained		3.66	2.13	1.93	
Total variance explained					22%

Table III Appendix 2.3

Factor pattern in the four factor solution (Varimax)

	Factor	I	II	III	IV	h
	Abbreviated item descriptions					
1	Show me around in a new place	-.43				.24
2	Fun going to a discoteque		.33	-.43		.30
3	Fun going to a party			-.23		.12
4	Booring to see the same old faces	.24		-.20		.35
5	Like to dangerous things	.56				.19
6	Taking the same route		-.22		-.35	.33
7	Rather see others perform		-.56			.22
8	Like to eat familiar dishes		-.44			.29
9	Exciting to bike fast	.50				.24
10	Not contact strangers		-.46			.31
11	Prefer living in the woods			.55		.31
12	Like to try parachuting	.58				.37
13	Like to be a seal	-.27		-.21		.17
14	Exciting to be hypnotized	.39	.23			.22
15	Preplanned route and destination				-.44	.23
16	Plunge gradually into cold water	-.40				.17
17	Like strong-flavoured candy	-.40				.19
18	Like new and unusual music		.33		.37	.28
19	Like to go for a walk alone	.23		.44		.25
20	Like ingenous friends				.58	.38
21	Fun to shop in the rush-hour	.32		-.27		.22
22	Like calm friends	-.22		.50	-.22	.35
23	Prefer canoing with a friend	-.22	.20	.42		.29
24	Not reading about violence	-.39	.25	.22		.27
25	Seldom get boored			.32		.20
26	Like many people around			-.57		.35
27	Like to move often	.30				.12
28	Don´t mind changing plans		.23			.08
29	Hunting lions in Africa	.63				.44
30	Pondering for a long time				.39	.19
31	Exciting with unexpected things				.41	.20
32	People that do different things		.24		.46	.27
33	Spending time with one friend		-.43	.28		.32
34	Jump into ice-cold water	.42	.44			.39
35	Joining a travelling circus	.22	.37			.24
36	Fantasies about dangerous things	.38			.29	.24
	Variance explained	3.18	2.07	2.08	1.77	
	Total variance explained					25%

Table IV

Appendix 2.4

Factor pattern in the five factor solution (Varimax)

	Factor	I	II	III	IV	V	h
	Abbreviated item descrictions						
1	Show me around in a new place	-.38		.29			.25
2	Fun going to a discoteque			.55			.35
3	Fun going to a party	.22		.37			.20
4	Booring to see the same old faces		-.33			.38	.28
5	Like to dangerous things	.56					.37
6	Taking the same route				-.38		.20
7	Rather see others perform		-.38	-.24		-.36	.37
8	Like to eat familiar dishes					-.47	.25
9	Exciting to bike fast	.51					.31
10	Not contact strangers					-.50	.27
11	Prefer living in the woods		.37	-.41			.31
12	Like to try parachuting	.56				.21	.37
13	Like to be a seal			.40			.23
14	Exciting to be hypnotized	.40				.20	.23
15	Preplanned route and destination				-.52		.31
16	Plunge gradually into cold water	-.42					.18
17	Like strong-flavoured candy	.43					.20
18	Like new and unusual music				.34	.36	.30
19	Like to go for a walk alone			-.50			.32
20	Like ingenous friends		-.40		.46		.41
21	Fun to shop in the rush-hour	.35		.25			.22
22	Like calm friends	-.21	.37	-.35	-.20		.35
23	Prefer canoing with a friend	-.20	.39	-.23	.20		.30
24	Not reading about violence	-.41	.22			.25	.29
25	Seldom get boored		.55				.31
26	Like many people around		-.24	.51			.35
27	Like to move often	.23	-.28			.28	.22
28	Don´t mind changing plans				.23		.11
29	Hunting lions in Africa	.62					.44
30	Pondering for a long time				.45		.22
31	Exciting with unexpected things				.48		.29
32	People that do different things				.44	.27	.27
33	Spending time with one friend		.27			-.60	.46
34	Jump into ice-cold water	.44	.20			.39	.39
35	Joining a travelling circus	.25				.28	.21
36	Fantasies about dangerous things	.35			.29		.24
	Variance explained	3.04	1.67	1.83	1.85	2.02	
	Total variance explained						29%

Table V

Appendix 2.5

Factor pattern in the six factor solution (Varimax)

	Factor	I	II	III	IV	V	VI	h
	Abbreviated item descriptions							
1	Show me around in a new place	-.43					.28	.30
2	Fun going to a discoteque			-.40			.45	.37
3	Fun going to a party					-.22	.51	.35
4	Booring to see the same old faces		.45			.24		.31
5	Like to dangerous things	.57			.20			.39
6	Taking the same route				-.38	-.24		.22
7	Rather see others perform					-.28	-.48	.38
8	Like to eat familiar dishes					-.51		.29
9	Exciting to bike fast	.57						.39
10	Not contact strangers					-.61		.42
11	Prefer living in the woods			.59			.20	.42
12	Like to try parachuting	.51						.37
13	Like to be a seal		-.32	-.37				.27
14	Exciting to be hypnotized	.37					.21	.23
15	Preplanned route and destination				-.54			.33
16	Plunge gradually into cold water	-.44						.21
17	Like strong-flavoured candy	.44						.21
18	Like new and unusual music	-.25		.20	.29	.30		.32
19	Like to go for a walk alone			.52				.32
20	Like ingenous friends	-.23	.51		.41			.48
21	Fun to shop in the rush-hour	.33					.23	.22
22	Like calm friends		-.39	.34			-.20	.37
23	Prefer canoing with a friend	-.22		-.29	.32	.20		.30
24	Not reading about violence	-.37	-.20			.33		.31
25	Seldom get boored		-.55					.33
26	Like many people around		-.50				.22	.35
27	Like to move often	.22	.33			.21		.22
28	Don't mind changing plans				.24			.13
29	Hunting lions in Africa	.56	.20	.21				.45
30	Pondering for a long time				.44			.23
31	Exciting with unexpected things				.50			.30
32	People that do different things				.42	.37		.34
33	Spending time with one friend		-.37			-.53		.46
34	Jump into ice-cold water	.39				.29	.36	.39
35	Joining a travelling circus						.48	.30
36	Fantasies about dangerous things	.24	.27	.25	.27		.24	.33
Variance explained		2.87	1.74	1.84	1.77	1.80	1.62	
Total variance explained								32%

Table VI Appendix 3.1

Factor-structure in the two-factor solution for boys and girls.

Factor I (Varimax)

Item		Boys	Girls
5	Like to do dangerous things	.57	.37
9	Exciting to bike fast	.53	.39
29	Hunting lions in Africa	.52	.30
26	Like many people around		.49
22	Like calm friends	.48	.52
23	Prefer canoing with a friend	.42	.46
12	Like to try parachuting	.41	.35
2	Fun going to a discoteque		.39
25	Seldom get boored	.32	.38
3	Fun going to a party		.36
27	Like to move often		.34
17	Like strong-flavoured candy	.32	.33
33	Spending time with one friend	-.35	.31
14	Exciting to be hypnotized	.31	.30
34	Jump into ice-cold water	.38	
21	Fun to shop in the rush-hour	.38	.46
24	Not reading about violence	-.35	.50
4	Booring to see the same old faces	.32	.27
Variance Explained		3.21	3.77

Factor II

Item			
7	Rather see others perform	-.47	-.27
8	Like to eat familiar dishes	-.47	-.34
18	Like new and unusual music	.47	.34
30	Pondering for a long time	.43	
31	Exciting with unexpected things	.43	.34
35	Joining a travelling circus	.42	.30
36	Fantasies about dangerous things	.41	.39
29	Hunting lions in Africa		.49
34	Jump into ice-cold water		.48
12	Like to try parachuting		.45
6	Taking the same route	-.38	-.41
10	Not contact strangers		.41
15	Preplanned route and destination	-.37	-.36
14	Exciting to be hypnotized	.37	.33
23	Prefer canoing with a friend	.37	
32	People that do different things		.34
Variance explained		2.63	2.33

Table VII Appendix 3.2

Factor-structure in the three-factor solution for boys and girls

Factor I (Varimax)

Item		Boys	Girls
26	Like having many people around		.57
5	Like to do dangerous things	.60	
9	Exciting to bike fast	.58	
11	Prefer living in the woods		-.53
29	Hunting lions in Africa	.57	
24	Not reading about violence	-.43	-.43
23	Prefer canoing with a friend		-.45
2	Fun going to a discoteque		.44
19	Like to go for a walk alone		-.44
22	Like calm friends	-.33	-.43
3	Fun going to a party		.40
21	Fun to shop in the rush-hour		.41
13	Like to be a seal	-.37	
13	Exciting with unexpected things	.37	.26
1	Show me around in a new place	-.35	
16	Plunge gradually into cold water	-.34	
12	Like to try parachuting	.33	
Variance explained		2.53	2.55

Factor II

Item			
29	Hunting lions in Africa		.61
36	Fantasies about dangerous things	.42	.57
5	Like to do dangerous things		.56
12	Like to try parachuting		.49
14	Exciting to be hypnotized	.31	.46
34	Jump into cold water		.41
30	Pondering for a long time	.48	
8	Like to eat familiar dishes	-.46	
18	Like new and unusual music	.44	
32	People that do different things	.42	
23	Prefer canoing with a friend	.41	
7	Rather see others perform	-.42	
9	Exciting to bike fast		.40
35	Joining a travelling circus	.38	.39
1	Show me around in a new place		-.33
16	Plunge gradually into cold water		-.32
15	Preplanned route and destination	-.39	-.31
17	Like strong-flavoured candy		.30
22	Like calm friends		-.31
27	Like to move often		.31
6	Taking the same route	-.36	-.25
11	Prefer living in the woods	.36	
Variance explained		2.47	3.03

Factor III

Item			
10	Not contact strangers	-.49	-.52
18	Like new and unusual music		.50
2	Fun going to a discoteque	-.52	
33	Spending time with one friend	.50	.50
26	Like many people around	.47	
34	Jump into ice-cold water	.47	.26
8	Like to eat familiar dishes		-.47
32	People that do different things		.43
14	Exciting to be hypnotized	.37	
4	Booring to see the same old faces	.37	.21
22	Like calm friends	-.36	
21	Fun to shop in the rush-hour	.35	
11	Prefer living in the woods	-.35	
7	Rather see others perform		-.37
20	Like ingenuous friends		.36
6	Taking the same route		-.30
Variance explained		2.54	2.14

Table VII Appendix 3.3

Factor-structure in the four-factor solution for boys and girls.

Factor I (Varimax)

Item		Boys	Girls
29	Hunting lions in Africa	.54	.62
5	Like to do dangerous things	.56	.46
9	Exciting to bike fast	.54	.33
12	Like to try parachute-jumping	.35	.51
36	Fantasies about dangerous things		.53
34	Jump into ice-cold water		.50
31	Exciting with unexpected things	.49	
24	Not reading about violence	-.47	.22
14	Exciting to be hypnotized		.44
35	Joining a travelling circus		.42
16	Plunge gradually into cold water	-.41	-.36
27	Like to move often		.40
13	Like to be a seal	-.36	
15	Preplanned route and destination	-.35	
17	Like strong flavoured candy		.32
22	Like calm friends	-.31	-.28
	Variance explained	3.21	3.77

Factor II

Item		Boys	Girls
26	Like to have many people around		.59
11	Prefer living in the woods	.28	-.55
8	Like to eat familiar dishes	-.50	
18	Like new and unusual music	.47	
19	Like to go for a walk alone	.23	-.46
32	People that do different things	.46	
2	Fun going to a discoteque		.45
22	Like calm friends		-.44
30	Pondering for a long time	.43	
36	Fantasies about dangerous things	.43	
23	Prefer canoing with a friend	.37	-.43
35	Joining a travelling circus	.42	
24	Not reading about violence		-.41
7	Rather see others perform	.39	
21	Fun to shop in the rush-hour		.39
3	Fun going to a party		.38
6	Taking the same route	-.37	
14	Exciting to be hypnotized	.35	
25	Seldom get boored		-.32
15	Preplanned route and destination	.31	
33	Spending time with one friend	-.30	-.31
Variance explained		2.47	2.14

Factor III

Item		Boys	Girls
33	Spending time with one friend	-.52	.45
8	Like to eat familiar dishes		.54
10	Not contact strangers	-.47	.46
7	Rather see others perform		.43
18	Like new and unusual music		-.41
26	Like many people around	.41	
21	Fun to shop in the rush-hour	.40	
4	Booring to see the same old faces	.39	-.22
5	Like to do dangerous things	.26	.37
23	Prefer canoing with a friend	-.37	
34	Jump into ice-cold water	-.36	-.35
22	Like calm friends	-.36	
Variance explained		2.42	1.82

Factor IV

Item		Boys	Girls
2	Fun going to a discoteque	.61	
32	People that do different things		.53
3	Fun going to a party	.49	
7	Rather see others perform	-.47	
20	Like ingenuous friends		.46
31	Exciting with unexpected things		.46
6	Taking the same route		-.44
15	Preplanned route and destination		-.42
1	Show me around in a new place	.34	-.39
19	Like to go for a walk alone	-.34	
28	Don´t mind changing plans		.33
30	Pondering for a long time		.31
Variance explained		1.63	1.95

Appendix 4

The sensation-seeking scale for 12-13 year old children

1. A I prefer someone to accompany me and show me around when I come to a new place.
   B I like to explore a new place by myself.

2. A It is fun to go to a discoteque.
   B I think it is too noisy on a discoteque.

4. A It is booring to see the same old faces every day.
   B I like the comfortable familiarity of seeing the same people everyday.

5. A Sometimes I like to do dangerous things.
   B A sensible person avoids doing dangerous things.

6. A I prefer taking the same route every time I go to a place.
   B Sometimes I take a different route to a place I often visit, just for the sake of variety.

8. A I like to eat familiar dishes that I know taste well.
   B I think it is exciting to eat food that I have never tasted before.

9. A I think it is exciting to drive my bike as fast as I can down a hill.
   B It is dangerous to drive a bike real fast down a hill.

10. A I rather not contact strangers.
    B I enjoy contacting people that are new to me.

12. A I would like to try parachute jumping.
    B I would not like to try parachute jumping.

14. A It would be exciting to be hypnotized.
    B I would not like to be hypnotized.

15. A When I go for a picknick I want to plan the route and destination beforehand.
B I prefer picknicks where neither destination nor route is planned in advance.

16. A When I am going to take a swim in a cold lake I plunge gradually in order to get used to the water.
B When I am going to take a swim in a cold lake I jump or dive directly into the water.

17. A I like candy that has such a strong flavour that one gets a chock tasting it.
B I like candy that has a moderate flavour.

21. A I think it is fun to go to a shopping-center in the rush-hour.
B I can´t uncerstand people who like to shop in the rush-hour.

22. A I prefer friends that are calm and even tempered.
B I prefer friends that are impulsive and hot-headed.

24. A I don´t like to read about violence in magazines.
B I think it is exciting to read about violence in magazines.

25. A I seldom get boored and don´t mind doing the same thing for a long period of time.
B I easily get boored and prefer to be engaged in many things at the same time.

26. A I feel good when there many people around.
B I feel good when there are not so many people around.

27. A I would like to move often and live in many different places when I become grown-up.
B I would like to live in the same place all the time when I become grown-up.

29. A It would be exciting to hunt lions in Africa.
B It seems dangerous to hunt lions in Africa.

31. A I think it is fun and exciting when something unexpected happens.
B I don´t like when something unexpected happens.

32. A I enjoy being with people who engage in strange and different things.
B I don´t enjoy being with people who engage in strange and different activities.

33. A I feel most comfortable when I am with people that I know well.
B I think it is exciting to be with people that are new to me.

34. A I think that I would like to take a sauna in the winter-time and plunge into an ice-cold ice-hole.
B It doesn´t seem nice at all to plunge into an ice-cold ice-hole when you take a sauna in the winter-time.

35. A I think I would enjoy joining a touring circus.
B I think it would be tiresome to join a touring circus.

36. A I often dream of doing exciting and dangerous things.
B Most of the time I dream of doing quite ordinary things.

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